

(1) TITLE

DIGITAL ANNOTATOR

(2) CROSS-REFERENCE TO RELATED APPLICATIONS

Not Applicable.

5 (3) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not Applicable.

(4) REFERENCE TO AN APPENDIX

Not Applicable.

10 (5) BACKGROUND OF THE INVENTION

(5.1) FIELD OF THE INVENTION

[0001] The present invention relates generally to computers and computer peripheral devices and, more specifically, to a writing device which functions as a tablet for temporarily bookmarking information.

15 (5.2) DESCRIPTION OF RELATED ART

[0002] As shown in FIGURE 1 (Prior Art), internet access software - commonly known as a "web browser" (or more simple "browser") - includes a built-in "bookmarking" function. ("Internet" is used herein as a generic term for a collection of distributed, interconnected networks (ARPANET, DARPANET, World Wide Web, or the like) that are linked together by a set of industry standard protocols (e.g., TCP/IP, HTTP, UDP, and the like) to form a global, distributed network; it is also used as generic for proprietary intranets.) On the screen view 100, there is a drop-down

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window(s) feature 101 accessed by clicking on the "Bookmarks" iconic virtual button 103. This function is designed for the end-user's semipermanent storage of web site addresses (known a Uniform Resource Locators (URL or URI or the like)). A user can add bookmarks to specific site page 105 currently in view by clicking on the

5 "Bookmarks" virtual button 103, then clicking on the "Add Bookmark" virtual button 107 at the top of the drop-down list 101, whereby the current web site address, or a synonym associated therewith, is added to the list bottom 111. URLs saved in this manner can be repeatedly referenced in the current or future on-line sessions until specifically deleted by the user using a provided "Edit Bookmarks" feature.

10 [0003] An alternative to bookmarking is to open multiple windows, one for each site of interest, and to stack or tile the windows, shuffling between them as the user's current interest dictates. Multiple windowing is of course limited by the video screen dimensions.

15 [0004] One inherent problem with the browser's bookmarking system is that the length of the list soon exceeds the common screen height, requiring either sub-listing horizontally using virtual folders 109 which open further lists or scrolling the screen to find the particular bookmark of current interest. Another alternative to semipermanent browser bookmarking is to write the URL on a piece of paper and re-enter the address each time the site is to be visited; this is of course time consuming and subject to the

20 frustrations attendant with keeping the paper, losing the paper, and repeating the search which discovered the site-of-interest in the first instance, if possible. Thus, there is a need for a system for creating temporary bookmarks for use only during a current

on-line session.

[0005] Also, there is known in the art electronic devices compatible with handwriting. Examples of inventions assigned to the common assignee, incorporated herein by reference, include the following. U.S. Pat. No. 5,629,499 by Flickinger, et al. for an ELECTRONIC BOARD TO STORE AND TRANSFER INFORMATION describes a pen and a board, which has a sensing mechanism, a memory device and a communication link. When the pen imprints symbols to the board, the symbols are not concurrently electronically displayed; but, the symbols are detected by the sensing mechanism, stored in the memory device, and can later be transferred to an electronic device through the communication link. U.S. Pat. No. 6,018,591 by Hull et al. for SCRIBBLE MATCHING describes methods for searching samples of electronic ink without having first to translate the ink into ASCII text. In pen-based computer devices, the identification and encoding of velocity minima in the input scribble is provided. Three scribble matching algorithms are described - a syntactic matcher, a word matcher, and an elastic matcher. The syntactic matcher encodes the input scribble according to the shape of the scribble in the region of the velocity minima. The word matcher encodes the input scribble according to the heights of the velocity minima from a reference line, using a continuous height encoding scheme. The elastic matcher encodes the input scribble according to a classification of the velocity minima and intermediate points. The use of velocity minima in the encoding of scribble input provides a stable set of points and leads to improved performance in comparison with known scribble matching methods. U.S. Pat. No. 6,050,490 by Leichner et al. for a

HANDHELD WRITING DEVICE AND RELATED DATA ENTRY SYSTEM describes a digital electronic clipboard used to mount pages or forms utilized in forms processing application, such as inventory tracking. A stylus having a writing tip at one end of the stylus and a bar code scanning mechanism at another end of the stylus is used to enter data on the pages or forms and scan bar codes appearing on the pages or forms themselves, or on a separate item to be associated with the form. The system detects whether bar code data or stylus position data is being generated and causes its CPU (central processing unit) to responsively process entered data.

[0006] Ink writing tablets associated with computing devices are also commercially available: e.g., the CrossPad™ digital notepad series by A.T. Cross Company of Lincoln, R.I.; the IBM™ ThinkPad™ TransNote™ laptop computer bundled with Ink Manager software; the Seiko Instruments SmartPad™ which works with a Palm Organizer personal digital assistant; and the Wacom™ Graphire tablet and inking pen (for signature capture, recognition and verification).

[0007] There is a need for a method of using ink writing tablets to facilitate computer search result indexing, adaptable to use with the Internet and other computerized functions.

(6) BRIEF SUMMARY OF THE INVENTION

[0008] A method and apparatus for creating and using temporary electronic bookmarks, such as those associated with a web browser, uses a digitizer tablet with an inking pen (or stylus). An end-user created symbol written on the tablet, in terms of Cartesian coordinates position, is associated contemporaneously with a specific

electronically addressable site as a temporary label for the site's address. A set of created symbols is then used as a current index into a data structure that holds the associated value related to the web site, allowing the user to jump between annotated sites using the created symbols.

5 [0009] In its basic aspect, the present invention provides a computer annotator system including: an electronic tablet having visible marking capability; a marking stylus associated with the tablet; and a device for associating at least one temporarily marked location on said tablet with a preselected data address wherein subsequently accessing said marked location with said stylus triggers a shift to said data address associated with said marked location.

10 [0010] In another aspect, the present invention provides a method for indexing computer-accessible sites, the method including: accessing a first computer-accessible site; associating an address indicative of the first computer-accessible site with a first location coordinate address on a computer writing tablet via a visible marking a first random location on said writing tablet during access of said first computer-accessible site; accessing a second computer-accessible site; and associating an address indicative of the second computer-accessible site with a second location coordinate address on a computer writing tablet via a visible marking on a second random location on said writing tablet during access of said second computer-accessible site.

15 [0011] In another aspect, the present invention provides a method for using a computer writing tablet, the method including: associating an input-output port of the tablet with signals indicative of computer data addresses; when each of a plurality of

computer data addresses is accessed, writing a mnemonic object associated therewith respectively, wherein a location on said tablet of the mnemonic object is coupled to a current one of said computer data addresses; and accessing any specific one of said plurality of computer data addresses by selecting the mnemonic object associated therewith.

[0012] In another aspect, the present invention provides a computerized method including: accessing an internet site; and associating an address of the site with a writable-erasable mnemonic device in a computer writing tablet.

[0013] In a further aspect, the present invention provides a computer memory including: computer code for recording temporary symbols; and computer code associating an address of preselected computer data with a writable-erasable mnemonic device in a computer writing tablet for receiving said temporary symbols.

[0014] In yet another aspect, the present invention provides an internet search tool including: an internet access device; in communication with the internet access device, a writing tablet and associated inking stylus; and associated with the combination of internet access device, writing tablet and stylus, program code using said tablet for generating bookmarks related to respective search resultant internet sites.

[0015] The foregoing summary is not intended to be an inclusive list of all the aspects, objects, advantages, and features of the present invention nor should any limitation on the scope of the invention be implied therefrom. This Summary is provided in accordance with the mandate of 37 C.F.R. 1.73 and M.P.E.P. 608.01(d) merely to

apprise the public, and more especially those interested in the particular art to which the invention relates, of the nature of the invention in order to be of assistance in aiding ready understanding of the patent in future searches. Objects, features and advantages of the present invention will become apparent upon consideration of the following explanation and the accompanying drawings, in which like reference designations represent like features throughout the drawings.

(7) BRIEF DESCRIPTION OF THE DRAWINGS

[0016] FIGURE 1 (Prior Art) is a typical web browser screen demonstrating the bookmarking function.

[0017] FIGURE 2A-2F is a series of schematic drawings illustrating the method and apparatus in accordance with the present invention.

[0018] FIGURE 3 is an exemplary tablet schematic as being used in accordance with the present invention as shown in FIGURES 2A-2F.

[0019] FIGURES 4A-4E is a flow chart of the software-firmware methodology in accordance with the present invention.

[0020] FIGURE 5 is an optional predetermined form as might be used in accordance with the present invention as shown in FIGURES 2A-2F and 3.

[0021] The drawings referred to in this specification should be understood as not being drawn to scale except if specifically annotated.

(8) DETAILED DESCRIPTION OF THE INVENTION

[0022] Reference is made now in detail to a specific embodiment of the present invention, which illustrates the best mode presently contemplated by the inventor for

practicing the invention. Alternative embodiments are also briefly described as applicable.

[0023] Turning to FIGURE 2A, the end-user 200 is depicted using a web browser 201 on a computer 203 (or other internet access device, e.g., WebTV™ device, internet-ready cell phone, or the like) coupled either by wire 206, or wireless, to a digitizer tablet 205 having a surface 207 on which pencil, pen, inking stylus, electronic ink device, writable-erasable electronic display (e.g, LCD type), or the like may be used to create a visible marking, or “symbol,” on the surface. “Inking stylus” will be the term used generically hereinafter for any such device. One or more of the foregoing apparatus described in the Background hereinbefore, or the like, may be adapted for use with the present invention and used as said tablet 205. It is an advantage of the present invention that a sophisticated, high resolution, marking device and tablet is not required.

[0024] The user 200 uses the browser 201 to find web sites of interest over the internet 202. In a known manner, a search term, e.g. “U.S. Presidents,” will provide a search results list from the server(s) 204 with which the browser 201 is in communication. As shown in FIGURE 2B, an exemplary site related to the search subject is “mount_vernon.com” 209, selected and accessed in a known manner via the browser 201 from the search results.

[0025] As depicted by FIGURE 2C, using an inking stylus 211 associated with the tablet 205, the end-user 200 writes a symbol - in this example “GW” - or any other mnemonic hint 213 associated with the site on the writing surface 207. As a result of this action, the geometric coordinates of the visible mnemonic hint 213 become an

index for the URL of the current web page - e.g., http://www.mount_vernon.com - in accordance with the present invention as described in more detail hereinafter.

[0026] Turning to FIGURE 2D, the user finds one or more other sites of interest; in continuing the U.S. Presidents exemplary search, e.g., <http://www.monticello.org>. As shown in FIGURE 2E, using the stylus 211 again, the user writes a second mnemonic hint, "TJ," 215 on another region of the tablet surface 207. The coordinates of this hint 215 on the surface 207 serves as the index for the Thomas Jefferson Monticello site 209' URL.

[0027] The indexing of the mnemonic hints 213, 215 is better understood with reference to FIGURE 3. The surface 207 of the digitizer tablet can be defined as a coordinate system, e.g. a Cartesian coordinate grid. Each mnemonic hint location on the surface 207 can thus convey information independent of the individual semantic meaning of the hint. For example, the hint "GW" 213 is in a surface area bounded by coordinate set: 0,0 + 0,300 + 400,300 + 400,0 (or other data stream recognizable as a marked position) - viz., it forms a temporary bookmark - on the tablet surface 207. (Note that having the Cartesian coordinates origin 0,0 in the lower left hand corner of the tablet as shown in FIG. 3 is just one possible exemplary configuration. Other systems may be employed in accordance with the present invention.) This coordinate set can be used as an index into a data structure stored in the computer memory that holds the associated value associated with the mnemonic hint, viz., the web site URL for http://www.mount_vernon.com.

[0028] In operation, the user 200 uses the inking tablet 205 surface 207 to create

visible mnemonic hints 213, 215 related to sites of interest from the session search results (note that one or more searches can be performed during the on-line session and hints added to the tablet 205 as long as separate surface 207 regions are written in; writing over a hint with would effectively erase the first indexed site, changing it to the currently viewed site). At any time during which a current mnemonic hint 213, 215 index is stored in memory, it can be tapped or clicked on and the computer will jump to the associated site. Sites visited but that are not of continuing interest, are merely not annotated on the tablet 205.

[0029] If the user, currently at the web site for Jefferson's Monticello as shown in FIGURE 2E decides they wish to return to the Mount Vernon site, using the stylus 211 as shown in FIGURE 2F, the user simply touches the "GW" mnemonic hint serving as the temporary bookmark for that URL. The web browser 201 (FIGURE 2A only) is directed to jump back to the original web site 209 stored in association with the hint 213, viz., http://www.mount_vernon.com.

[0030] In an alternative embodiment, the surface 207 is predefined with function regions 501 and user mnemonic symbol entry regions 502. An exemplary form 500 as shown in **FIGURE 5** is a temporary (tear off) or permanent overlay for the tablet 205 marking surface 207, providing fifteen predefined indexing regions: three for the functions DEFINE (or ENTER - for new hints), SELECT (or GO TO - for jumping between hints), CLEAR (or ERASE), and twelve mnemonic hint entry regions, or boxes, 502' for use during a current on-line session. This simplifies the algorithm required for relating the handwritten hint with a surface 207 position as the position of each box, and

hence the mnemonic entered, is always a given regardless of which box 502' of the entry region 502 is used. Commercially available form control software can augment this alternative.

[0031] Turning now to **FIGURE 4A-4E**, a flowchart of an exemplary embodiment methodology 400 in accordance with the present invention. FIGURE 4A-4E is a flowchart demonstrating the process which can be implemented in software (e.g., on-board the computer) or firmware (on-board the tablet). The flowchart represents a process that is "event-driven;" i.e., it will continuously loop, waiting for another new "pen event" when no other computation is being carried out. Therefore, no "STOP" box is used.

[0032] A digitizing tablet generates a sequence of "pen events" which consist of an event code plus numeric values corresponding to the x-coordinate and y-coordinate of the pen. For example, commercially available tablets such as by Wacom, supra, have at least three event codes: PEN_DOWN, PEN_UP, and PEN_AWAY. To facilitate understanding of the exemplary embodiment of the present, these same code names are used. A PEN_DOWN event occurs when the pen actually touches the tablet surface. A PEN_UP event occurs when the pen is lifted to within some predefined threshold distance about the tablet and is moved across the tablet surface (e.g., the handwriting motion associated with crossing a "t" or dotting an "i"). A PEN_AWAY event occurs when the pen is lifted beyond the threshold distance.

[0033] The process 400 is initialized, step 4110, defining global variables as required per an specific implementation. Again, PEN_UP, PEN_DOWN and

PEN_AWAY, collectively referred to as "pen events," are typical of stylus type devices. For the purpose of describing the basic embodiment, it is assumed that the preprinted tablet form 500 is employed; referring simultaneously to FIG. 5 will aid in understanding the process flow. When using a preprinted form such as shown in FIG. 5, defining function boxes, i.e., tablet surface regions, 501, such as DEFINE, SELECT, CLEAR, is provided. The tablet input-output port (I/O) is initialized. Whenever a pen event occurs, e.g., notation 213, 215 (FIG. 3), the event is read via the I/O port. Tablet surface 207 X and Y coordinates associated with the event are, at least temporarily, stored, step 4120.

[0034] When a PEN_AWAY event occurs, step 4130, Yes-path, the process loops back to await a new event. When the pen is in communication with the tablet surface 207, PEN_DOWN, step 4130, No-path, a determination is made, step 4140, whether the current X,Y coordinates are in the DEFINE region of function regions 501. If not, step 4140, No-path, the SELECT and CLEAR functions are checked for activation, steps 4150, 4160. Each function has a related subroutine - in this embodiment, starting steps 4210, 4310, 4410, respectively - for handling whatever functions have been built into the specific implementation.

[0035] Assuming the user is not in a function box 501, see step 4160, No-path, the maximum and minimum values of X, Y are computed, step 4170, determining the bounding box 502 of user define hints last entered. In other words, before looping back to the next pen event, step 4120, in step 4170, a runny tally of the minimum and maximum values of the X and Y coordinates is provided. No cache or buffer to retain all such points is required, only those four values which will determine the bounding box

where the user has written. For example, at the point of the process 4160, NO-path, the user must be writing in one of the bounding boxes 502'. Therefore, only the location of the bounding box needs to be tracked. For example,

if (x>maximum_x) then maximum_x = x;

5 if (y > maximum_y) then maximum_y = y;

if (x>minimum_x) then minimum_x=x;

if (y>minimum_y) then minimum_y = y.

These minimum and maximum values of X and Y are used in steps 4230 and 4240 when either the DEFINE or SELECT are selected, viz., 4140, Yes-path, and 4150, Yes-path, respectively.

10 [0036] If the user is in the DEFINE bounding box, step 4140, Yes-path, a next pen event is detected, and detection continued, i.e., the process loops, until a PEN_AWAY is encountered, steps 4210, 4220. Once the pen event is a PEN_AWAY, step 4220, Yes-path, registers the coordinates of a hint bounding box of the form 502 (or without the form creates a free-form bounding box with an area, "j," as shown in FIG. 15 3 and described hereinbefore). The bounding box is associated with the current URL from the web browser page, e.g. 209, 209', Fig. 2), step 4230. Thus, a new hint is stored.

20 [0037] If the user clicks activation in the SELECT bounding box, step 4150, Yes-path, a next pen event is detected, and detection continued, i.e., the process loops, until a PEN_AWAY is encountered, steps 4310, 4320. Once the pen event is a PEN_AWAY, step 4320, Yes-path, it is indicative that the user has selected a

previously recorded hint (e.g., 213, 215, Fig. 2) and the web browser is instructed to jump to the previously associated URL (see steps 4210-4230), step 4330.

[0038] If the user is in the CLEAR bounding box, step 4160, Yes-path, a next pen event is detected, and detection continued, i.e., the process loops, until a PEN_AWAY is encountered, steps 4410, 4420. Once the pen event is a PEN_AWAY, step 4420, Yes-path, memory is cleared, step 4430, of previously recorded hints (see steps 4210-4230). The tablet surface 207 is again free to start a new session.

[0039] Note that with tablet implementations using actual tear-off paper sheets for annotating mnemonic hints, the paper can still be kept as a record or reminder of the on-line session.

[0040] Note that it is specifically intended that the method and apparatus herein described can be used with any other software besides a browser which uses an addressing scheme to jump between indexed locations. For example, a library may develop a proprietary search program, or the like. That is, in addition for being used in association with Internet URI addresses, the computer annotator system just described is suitable for adaptation to temporarily associating any computer data that is addressable at a predefined address with a written mnemonic hint created by the user on the tablet surface. The following are some other examples.

[0041] Mnemonic hints can be associated with any of the following entities for the purpose of selecting or accessing:

- (1) a cell in a spreadsheet,
- (2) a voice mail message,

- (3) an e.mail message,
- (4) a song on a digital player,
- (5) a video selection or specific frame locations thereof on a digital video drive,
- (6) a video selection or specific frame locations thereof on a digital recorder - player
- 5 (e.g., TiVo™ or the like),
- (7) a video selection or specific frame location thereof on a streaming video player (e.g., RealPlayer™ or the like).

For spreadsheets, the association is made to the cell index. For e.mail and voicemail selection, the link is made to the message index. For music and video playback, the association is to the desired track (elapsed time within each track also could be used as an index).

10 [0042] It is commonplace to video tape business meetings, legal proceedings and the like. The resulting video is converted to a format such as streaming video and made available from a server. Using a unit in accordance with the present invention, marks on the tablet during the taped session could designate segments of specific

15 interest. Playback is then facilitated by using the mnemonic hints to access directly to those points of specific interest.

[0043] Note also that the present invention can be adapted for using a stylus capable personal digital assistant (PDA) into a temporary bookmarking annotator.

20 [0044] The foregoing description of the preferred embodiment of the present invention has been presented for purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise form or to exemplary

embodiments disclosed. Obviously, many modifications and variations will be apparent to practitioners skilled in this art. Similarly, any process steps described might be interchangeable with other steps in order to achieve the same result. The embodiment was chosen and described in order to best explain the principles of the invention and its best mode practical application, thereby to enable others skilled in the art to understand the invention for various embodiments and with various modifications as are suited to the particular use or implementation contemplated. It is intended that the scope of the invention be defined by the claims appended hereto and their equivalents. Reference to an element in the singular is not intended to mean "one and only one" unless explicitly so stated, but rather means "one or more." Moreover, no element, component, nor method step in the present disclosure is intended to be dedicated to the public regardless of whether the element, component, or method step is explicitly recited in the following claims. No claim element herein is to be construed under the provisions of 35 U.S.C. Sec. 112, sixth paragraph, unless the element is expressly recited using the phrase "means for. . ." and no process step herein is to be construed under those provisions unless the step or steps are expressly recited using the phrase "comprising the step(s) of. . ."